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MODELLING TEAM-BASED LEARNING STRATEGY ELEMENTS FOR BACHELOR STUDIES IN AN E-LEARNING ENVIRONMENT

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Abstract

Purpose - to create a model for university bachelor studies based on the elements of a team-based learning strategy for the e-learning environment.

Research methodology. The research is based on the Connectivism theory.

Research methods - The studies include the analysis of literature and it offers an ontology-based guidance system.

Findings – A model based on elements of a team-based learning strategy has been developed to support team learning skills. The advantage of the model is that it is not linked to any of the world-wide e-learning environments, but can easily be connected to existing ones. Ontology-based guidance system, suggesting learning components (learning activities, environments, tools, programs and etc.).

Research limitation – this research its only first step - to create a model for university bachelor studies based on the elements of a team-based learning strategy for the e-learning environment , next steps should be to validate the model, then to construct the prototype and then to validate prototype.

Value - despite the growing popularity of distance education, it is necessary to create the best learning management system adapted for Team-based learning strategy.

Keywords – team-based learning, modelling, e-learning, virtual learning.

Research type – research paper.

JEL classification – M 15, I23, C6.

Introduction

Modern organizations focus on global markets. To be competitive in global business world, a possibility to work in virtual teams became necessary for both employees and managers. Staff abilities and competences of the virtual work enabling organizations to remain much more successful in current turbulent times, therefore, it is important to develop the appropriate virtual

work environment in organizations. This challenge is relevant for the higher education institutions, too. Thus, a strategic purpose for many schools in higher education is to develop virtual team-work competences in an e-learning environment.

As there are a lot of different e-learning concepts, means and applications, this giving many choices for users. However, when considering how to maximize any particular e-learning model's applicability, it can be observed that there is no unambiguous way, and various improvements are needed. Based on this demand, there was created an independent theoretical module that could be integrated into any e-learning environment with the aim to organize e-learning and virtual teamwork more systematically.

To develop virtual teamwork competencies, it was chosen to rely on elements of a team-based learning strategy. This is an increasingly popular global strategy which is presented in the paper. While this strategy is not tailored to e-learning, the authors of this paper believe that this is the most appropriate strategy for developing competencies in virtual teamwork.

In Lithuania only authors of this article study phenomenon of team-based learning strategy. In the world team-based strategy are widely researchable. Latest articles shows that all researches can be split into separate two main directions: researches for application team-based learning strategies (Hassan, Ibrahim, and Hassan, 2018; Hurst-Kennedy, 2018; Greetham and Ippolito, 2018; Mousavi, Amini, Delavari, and Seifi, 2019; Bengü, 2019; Kazory and Zaidi, 2018), and researches for studies to measure impact of Team-based learning strategy (Carrasco, Behling and Lopez, 2018; Langdorf, Anderson, Navarro, Strom, McCoy, Youm and Ypma-Wong, 2018; Malekigorji, 2019; Roh, Kim, Park and Ahn, 2020; Wang, Hillier, Oswald and Lai, 2020; Currey, Sprogis and Burdeu, 2018; Espey, 2018; Krase, Pfeifer and Swan, 2018; Watkins, Forge, Lewinson, Garner, Carter, and Greenwald, 2018). Of course, researches are carried out in a wide range of fields and levels of study's, and in a wide range of aspects.

But still there were not found any studies aimed at adapting team-based learning strategy or its elements to the virtual environment.

In this paper is analyzed the issue of solutions ensuring the adoption of team-based learning strategy elements to an e-learning environment with the aim to compose a conceptual model for typical bachelor studies.

1. Theoretical background

The research is based on the *Connectivism theory*. Founder of this theory is Siemens (2005). This is a theory for understanding learning. The development of IT and growth in the use of the Internet, and mobile developments, make new and different educational structures (Kop and Hill, 2008). And as mentioned, this theory is product of digital age, where learning can be achieved

through networks, decision-making, collaboration, and diversity. emphasizes the ability to connect ideas, and to find and apply knowledge when it is needed (Makani, Durier-Copp, Kiceniuk, and Blandford, 2016).

2. Research methodology

The studies include the analysis of literature and it offers an ontology-based guidance system, suggesting learning components (learning activities, environments, tools, programs, etc.) based on team-building learning strategy elements.

To achieve the research aim, it was chosen to create a module for existing e-learning environments based on elements of a team-based learning strategy.

3. Team based learning strategy

Team-based learning (TBL) is an instructional strategy developed in the business school environment in the early 1990s by L. Michaelsen who wanted the benefits of small group learning within large classes. In 2001, a US federal agency awarded funds for educators in the health sciences to learn about and implement the strategy in their educational programs; Team-based learning strategy was put forward as one such strategy and as a result it is used in over 60 US and international professional schools of health sciences. Team-based learning is very different from problem-based learning (PBL) and other small group approaches in that there is no need for multiple faculties or rooms, students must come prepared to sessions, and individual and small groups of students (teams) are highly accountable for their contributions to team productivity. The instructor must be a content-expert but need not have any experience or expertise in group processes to conduct a successful TBL session. Students do not need any specific instruction in teamwork since they learn how to be collaborative and productive during the process. Team-based learning can replace or complement a lecture-based course or curriculum (Parmelee, Michaelsen, Cook, and Hudes, 2012).

Team-based learning strategies are widely applied in higher education, there is a lot of research related to its effectiveness in different study fields or programmes: in public administration (Broscheid, 2015), sociology (Stein, Colyer, and Manning, 2016), human resource management (Chung-Kai and Chun-Yu, 2017), business (Timmerman and Morris, 2015), ethics and management (Betta, 2016), microeconomics (Artz, Jacobs, and Boessen, 2016) and in programmes of other social sciences (Wanzek, et al., 2015).

Most of the research has been carried out in the field of team based learning in biomedicine and pharmaceuticals in particular (Emke, Butler, and Larsen, 2016; Fete, Haight, Clapp, and McCollum, 2017; Remington, et al., 2017; Jost, Brüstle, Giesler, Rijntjes, and Brich, 2017;

Hameed, et al., 2017; Frame, et al., 2016; Whitley, et al., 2015; Bleske, et al., 2016). According to Burgess (2014) Team-based learning strategy grew in popularity in the early 2000s after the Baylor College of Medicine won a grant to incorporate Team-based learning into many of their programs' curricula (Liu and Beaujean, 2017) This led to other U.S. medical schools adopting a Team-based learning approach.

In 2012 m. team-based learning strategy was applied in more than 60 American health care schools and in other countries as well (Parmelee, Michaelsen, Cook, and Hudes, 2012). More recently, team-based learning has spread all over the world: Asia, Europe, and the Middle East and as was mentioned before, was applied in various study programmes (Liu and Beaujean, 2017). According to Parmelee (2012), there are five team-based learning steps:

Step 1 – Advance assignment. Out-of-class/individual. Students receive a list of learning activities, accompanied by a set of learning goals. Student study materials to be prepared for the TBL session. Learning activities may include readings, videos, labs, tutorials, lectures, etc.

Step 2 – Individual readiness assurance test In-class/individual. Each individual student completes a set (10–20) of multiple-choice questions (MCQs) that focus on the concepts needed in order to be able to solve the Team Application problems.

Step 3 – Team readiness assurance test In-class/team. This is the same set of questions that each student answered individually but in this step the team must answer them through a consensus-building discussion. There must be a mechanism so that the team knows as soon as possible whether or not they have selected the correct answers because they need this immediate feedback to help them improve their decision-making processes.

Step 4 – Instructor clarification review. In-class/instructor. Students are given clarification from the instructor on the concepts they have been struggling with during the team readiness assurance test. At the end of the Clarification Review, students should feel confident that they are adequately prepared to solve more complex problems for the next Team-based learning step: the Team Application.

Step 5 –Team application In-class/team. This is the most important step! In teams, students are presented with a scenario/vignette that is similar to the type of problem that they will be grappling with in their careers. They are challenged to make interpretations, calculations, predictions, analyses, synthesis of given information and make a specific choice from a range of options, post their choice when other teams post theirs, then explain or defend their choice to the class if asked to do so.

The team application structure follows the 4 S's principles: Significant problem. Students solve problems that are as realistic as possible. Problems must authentically represent the type of problem that the students are about to face in the workplace or are foundational to the next level of

study. The answers must not be able to be found in any source (internet, textbook), but can only be discerned through in-depth discussion, debate, dialogue within a team. Same problem. Every team works on the same problem at the same time. Ideally, different teams will select different options for answers. Specific choice. Each team must make a specific choice through their intra-team discussion. They should never be asked to produce a lengthy document. Teams should be able to display their choice easily so that all teams can see it. Simultaneous report. When it is time for teams to display their specific choices to a particular question, they do so at the same time. This way, everyone gets immediate feedback on where they might stand in the posting and they are then accountable to explain and defend their decision.

Step 6 – Appeal. Out-of-class/team. A team may request that the instructor consider an alternative answer to the one designated as "best." The team must either provide a clear and usable re-write of the question if they think it was poorly worded, or a rationale with references as to why their choice was as good as the "best" chosen by the instructor. Only a team that takes the steps to write an Appeal is eligible to receive credit for a particular question (Parmelee, Michaelsen, Cook, and Hudes, 2012).

The selection of this strategy was determined by the Opatrny McCrod and Michaelson, (2014) research results. They concluded that data from study indicated that participation in a TBL in a prior semester creates team skills which are significant enough to carry over to a subsequent course earn significantly different, and better, peer evaluation score (Opatrny, McCord, and Michaelsen, 2014)

Naturally in mentioned researches about team-works was investigated not virtual team skills, so the authors of this paper presume, that identically can be develop virtual team skills as well.

4. E-learning

E-learning in the higher education sector in recent years has rapidly developed. Students prefer flexibility and quality in their studies and in a virtual environment (space). There are many possibilities to introduce students to this learning through co-operation. Global virtual opportunities allow students to learn from colleagues in other countries, fostering different cultures as well as facing challenges with communications at a global level.

There are a lot of learning environments: Sakai, eCollage, Canvas, Pearson, Bb Learn Ellucian, Angel, Naviance, Edmodo, D2L, Jenzabar, Campu Vue, SumTotal, Success Factor, Webstudy, Elluminate etc. oldest ones are commercial systems WebCT (since 1996), eCollage (since 1996), Blackboard (since 1997). The newest is the open source system such as Moodle (since 2002), Sakai (since 2005) and Canvas (since 2011). The most popular e-learning systems in higher education are Blackboard (Blackboard Inc., Washington, DC), WebCT (Washington, DC) and Moodle. It is important to notice that the popularity of these systems vary in different countries.

A number of companies and universities provide distance learning classes and in-service training on virtual platforms via the internet. This method provided independently from time and space, are conducted in a particular country and on occasion, worldwide (Kuscu and Arslan, 2016).

The definitions extracted from the literature review focus on different elements of e-learning. Specifically, four general categories of definitions were identified: 1) technology-driven (This category mostly includes definitions from private companies and a few academics that emphasise the technological aspects of e-learning, while presenting the rest of its characteristics as secondary. The definitions in this category portray e-learning as the use of technology for learning), 2) delivery-system-oriented (this category presents e-learning as a means of accessing knowledge (through learning, teaching, or training). In other words, the focus of these definitions is the accessibility of resources and not the results of any achievements.). 3) communication-orientated (this category considers e-learning to be a communication, interaction, and collaboration tool and assigns secondary roles to its other aspects and characteristics). 4) educational-paradigm oriented (this category defines e-learning as a new way of learning or as an improvement on an existing educational paradigm. The majority of the authors falling into this category work in the education sector) (Sangrà, Vlachopoulos, and Cabrera, 2012).

Sangrà, Vlachopoulos, and Cabrera (2012) represents a preliminary definition of e-learning which was prepared containing aspects of all four general categories. E-learning is an approach to teaching and learning, representing all or part of the educational model applied, that is based on the use of electronic media and devices as tools for improving access to training, communication and interaction and that facilitates the adoption of new ways of understanding and developing learning.

After the analysis of the contributions of the participating experts, the research arrived at the general conclusion that e-learning is part of the new dynamic that characterizes educational systems at the beginning of the 21st century, resulting from the merging of different disciplines, such as computer science, communication technology, and pedagogy, since all the collected definitions contained characteristics of more than one discipline. Consequently, the concept of e-learning can be expected to continue to evolve for a long time. In today's world, learning needs change very quickly and the concept and functions of e-learning must continuously be adapted to these needs. Moreover, the difficulty to include all the main features of the e-learning concept in a single definition was identified, since not all the authors made the same use of the concept and they considered different aspects as fundamental. In this context, and in order to take advantage of all the definitions created, the need to be flexible and generic enough to include the majority of these uses and features is considered compulsory. More analytically, this study resulted in an inclusive definition that takes into consideration the four main categories in which authors conceptualizes

e-learning: technology, delivery systems, communication, and educational paradigms (Sangrà, Vlachopoulos, and Cabrera, 2012).

E-learning integrates the main components of e-learning, such as Learning Management Systems (LMS), content management systems and learning-content management systems (Kasim and Khalid, 2016).

"Learning Management System (LMS) is a software application or web-based technology which has become a powerful tool for conducting an e-learning environment" (Srichanyachon, 2014)

Such kind of applications provides a multiway infrastructure that enables e-learning to be smart enough for students and gives a flexibility for a tutors. In the mentioned environment could be managed training materials, curriculum and evaluation tools. The most important, it is scalable on demand by adding additional modules, for tracking learning activities and results, such as quizzes, assignments and etc. LMS is engaging by the ability of learning inside and outside a classroom. It can either support face-to-face teaching, learning or communication in an attractive manner (Srichanyachon, 2014).

The primary role of LCMS is to manage digital assets used for developing learning products. These systems provide a database called a learning content object repository that will save the work done by authors of courses as learning objects, which can be accessed by the same or other authors to develop new learning, workflow information for convenient updating of content, course authoring capability, collaboration tools to enable course authors and learners to work together, some basic LMS capability ways to create and administer tests and quizzes (Jurubescu, 2008)

According to Coates (2007), Learning Management Systems are also platforms that include learning systems, course management systems, content management systems, portals, and instructional management systems (Kasim and Khalid, 2016)

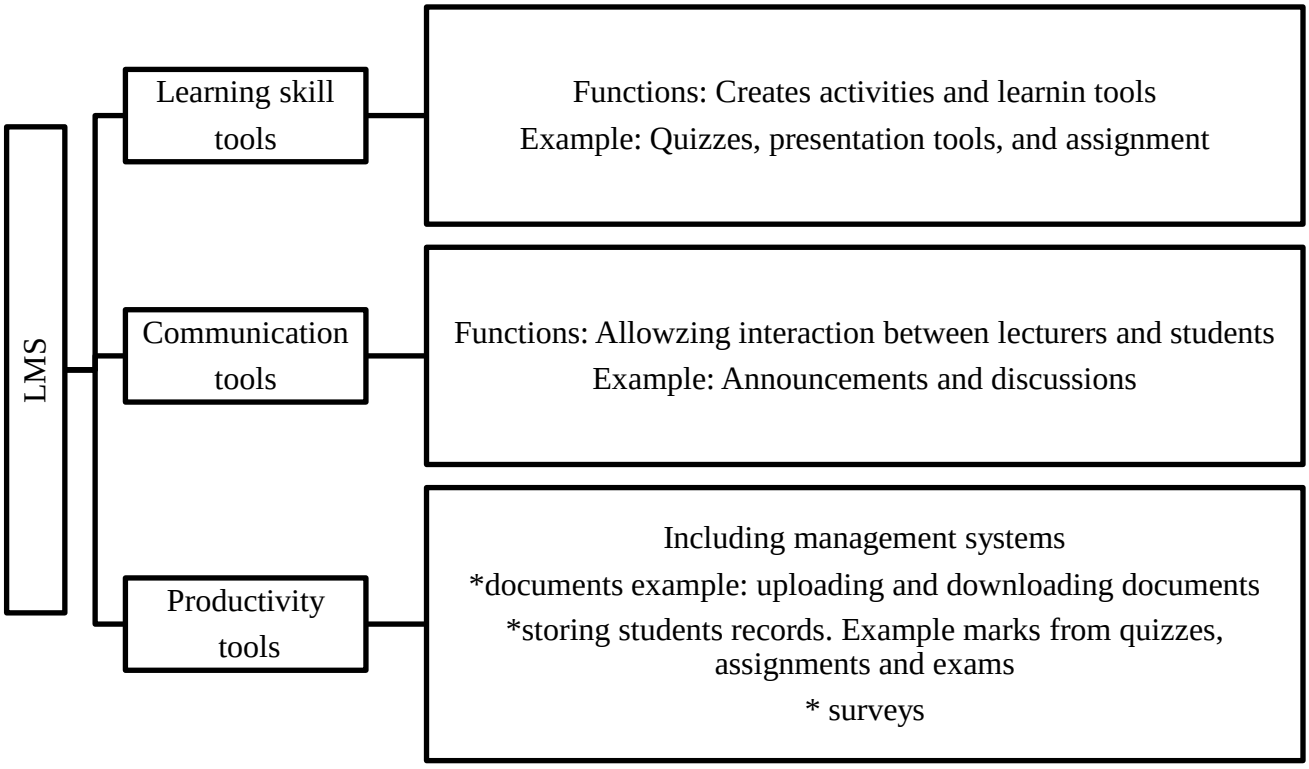
A Content Management System (CMS) can be defined by three dimensions: content, process, and technology or software (Lurie, 2002; Kasim and Khalid, 2016). Content: The text, images and other media that comprise your message is the heart of the system. Without content, a CMS is just a shell. Process: which develops and publish that content. There are Content Management Systems for all types of media, including print, video and radio Software: a CMS requires software that enables you to publish your content to the Internet, using process. This software will serve as a bridge, letting non-programmers enter and upload content, and then publish that content to web pages (Lurie, 2002).

There are various types of CMS, such as CMS Enterprise, CMS Component, CMS Web, document management, record management and others. CMS Enterprise comprises a strategy, tools and processes that enable all the employees within a company to access, manage, and check

documents, templates, media and other information assets (Hullavarad, O'Hare, and Roy, 2015; Kasim and Khalid, 2016). According to Whirl (2015), CMS Component is a database and software program that allows users to save, access, edit, and manage the content topic levels. It is often used for DITA content (XML) because it manages the connections between millions of components (Kasim and Khalid, 2016). According to Mohorovicic et al., (2010) CMS Web is an LMS that is designed to enable publishing web content one site where content creators can edit, send and present their content without needing to be familiar with Hypertext Markup Language (HTML) (Kasim and Khalid, 2016).

As mentioned before, there are a lot of e-learning systems and popularity varies between countries. For example, in the USA and Canada the fastest-growing LMS is Canvas. There is no other product close in terms of matching, the Canvas growth. Blackboard continues to lose market part, there is a growing line for "Other", capturing the growth of those systems with less than 50 active implementations as primary systems; systems like Jenzabar, Edvance360, LoudCloud Systems, WebStudy, Schoology, and CampusCruiser (Hill, 2016) In Lithuania the most popular is Moodle.

LMS can be categorised into three main types (Figure 1).



Source: Kasim and Khalid, 2016.

Figure 1. Types of Tools in Learning Management Systems (LMS)

In Lithuanian higher education institutions since 2004, Web CT has been used. It was the very first distance-learning environment in Lithuania, but more recently, all institutions have started to use the open source Moodle system. There are analysed Moodle and another open source learning environment like Sakai. There is a need to state that there are no opportunities to use a team-based strategy without installations of other modules such as BigBlueBotton, Zoom and etc. Unfortunately, BigBlueBotton is not user friendly, and other modules or programs are pay to use. There can be made the decision to create a model which will be available for use in a different learning environment and which will be friendlier to users.

After analyzing latest (2018 – 2020 years about 30 articles scientific articles associated with Team- based learning strategy, no studies related to the adaptation of team based learning strategy or its elements. to e-learning were found. Most of them investigate Team-based learning strategy efficacy to different study fields and etc. (Espey, 2018; Greetham and Ippolito, 2018; Figland, Blackburn, and Roberts, 2020; Walker, Lang, Caruso, and Salas-Hernandez, 2020) and etc.

5. Construction of the model: model functions, databases, architecture, system, processes

The following technologies are suggested for model development:

- Perl – programming language(very useful via development process can get straight to low level programming like Assembler)
- JavaScript – programming language for client-side programming
- Unix, Linux – installation platform
- WSS – web socket protocol.
- OpenSSL – cryptographic library
- MySQL – databases (or any other, freedom to your choice)
- Web server – front end web server (80,443 port), by your choice.
- Apache – back end web server (8080 port), by your choice.
- HTTPS – request protocol.
- TCP/IP – server (for supporting initiated client login using WSS protocol).

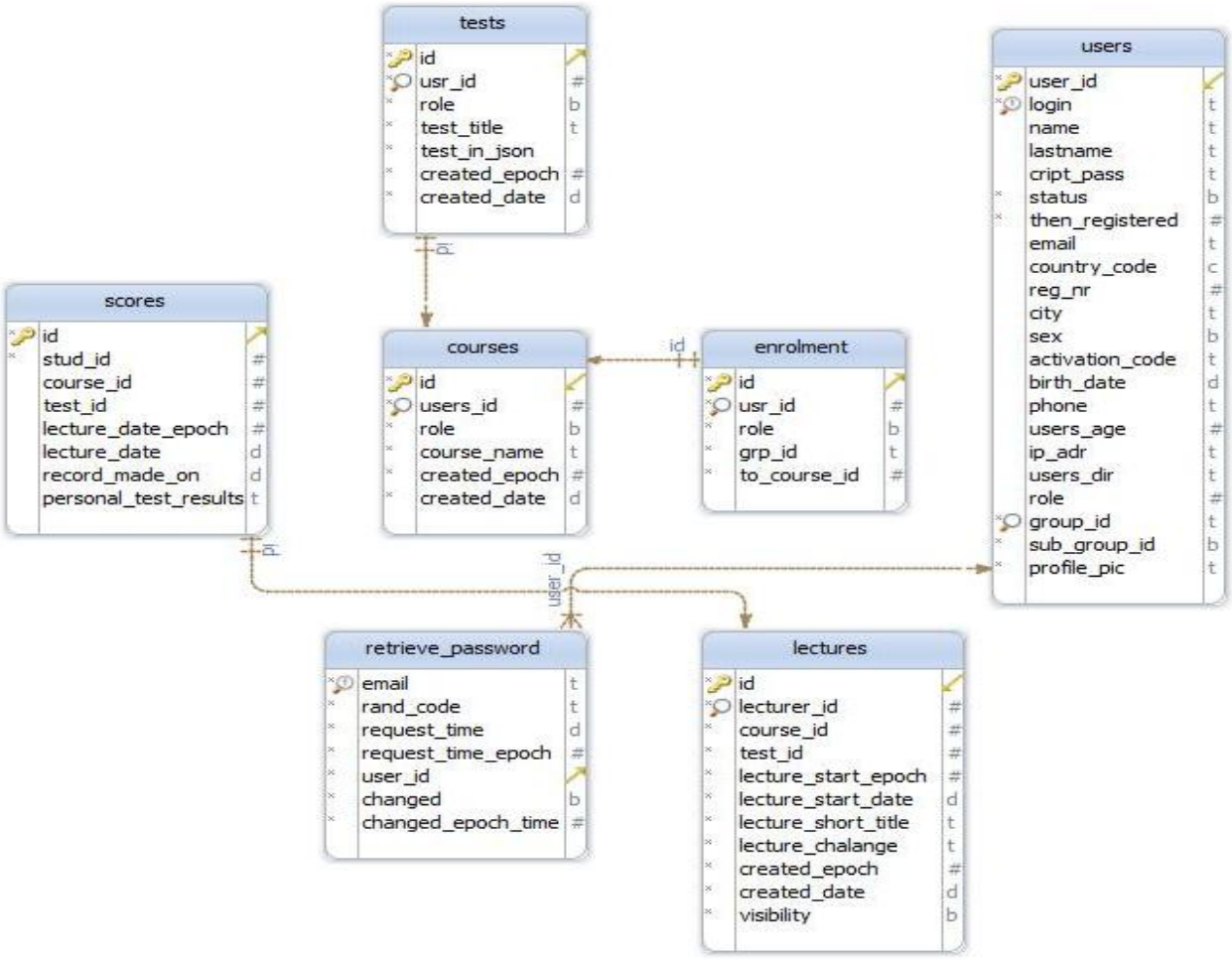
Model functions and their justification according to Sibley, et al., 2014; Parmelee, Michaelsen, Cook, and Hudes, 2012; Opatrny, McCord, and Michaelsen, 2014; Parmelee, Michaelsen, Cook, and Hudes, 2012; Michaelsen, Davidson, and Major, 2014; Huxham and Land, 2000 must be as folows:

1. Tool for group formation
2. Task submission tools
3. Generating tests according to the teacher's questions

4. Automatic assessment of test results
5. Showing completed tasks to all groups (at once)
6. Anonymous assessment of team colleagues
7. Process of Pre-Assurance with timer
8. Task execution timer
9. Chat room
10. Generating chat room activity statistics

First of all, it is needed to have a server ready for action: the OS FreeBSD been selected installed and configured; Installing and configuring the Web servers Nginx; Installing and configuring the web server Apache; Installing and configuring MySQL; SSL certificate acquisition. The database for this model has the following tables: Courses; Enrolment; Lectures; Scores; Test; Users.

The schematic representation of the database is shown in Figure 2.



Source: created by the autho rs.

Figure 2. Schematic representation of the theoretical model database

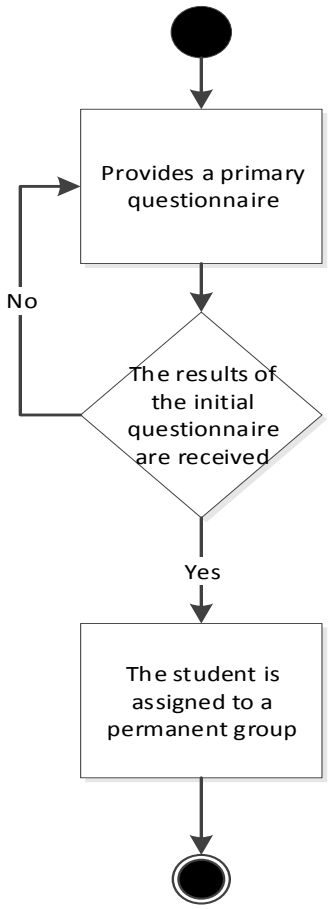
To implement the virtual team training strategy model, it is suggested to choose the principle of individual microservices, this principle has advantages against ordinary web application structure let's say the client -> internet -> server infrastructure, undoubtedly in this way it is possible to gracefully restart services, or simply hide from the end users' unexpected system crash. In addition, there is a need for expansion based on the principle of cloud service providers. i. y. dynamically control the number of affiliate processes on demand depending on the number of users growth, and capabilities of physical server resources. Although these are autonomous processes, they can communicate between each other via PIPE channels or signals. Such a solution lets developers easily integrate entities into any other VM environment that can run on Linux, Unix and, in some cases, Windows platforms.

Several tools were employed to attain a successful outcome: Notepad ++ - application for writing source code; Visio UML (Unified Modelling Language) is a unified modelling language designed to specify, display, and construct application structure and documentation.

The system on the server side was written using the Perl programming language. System data were stored as follows: the student data file is saved in a json format and separate directory; Learning Objects and their Interaction Data in a Protected MySQL Database.

The developed model should be designed to work on the Internet, be compatible with popular browsers such as Firefox, Opera, Chrome and others. The system from the perspective of the teacher should be simple: it connects, develops the subjects taught, places the material, creates / adjusts the tests and tasks, analyses the achievements of the students, completes the work in the system. The learning system from the perspective of the student should also be simple: although the first entry requires completing the form provided, the data directly involved in assignment of student to the proper permanent group, which, according to Michelson, is particularly important for grouping as diverse students. Reference should also be made to the elementary system of learning through a learning object, based on the tests and tasks that start with the settings, their automatic evaluations, and the ending of the training course. The student side activity tools should consist of seven phases: registration of students on the system; the student completes the original question in order to be allocated to a permanent group; independently study the submitted material; takes individual tests; conducts team tests; performs team tasks; completes work in the system. The new student joins using the login name and password generated by him / her. This creates the student's profile: the name is given in advance, and other information, such as study outcomes - during the study process. As mentioned above, the registration of the student provides a questionnaire according to which all respondents are divided into permanent groups. The results of the tests and tasks are stored in the database. When a learner completes his / her work in the system, his / her learning outcomes (evaluations) are automatically summarized.

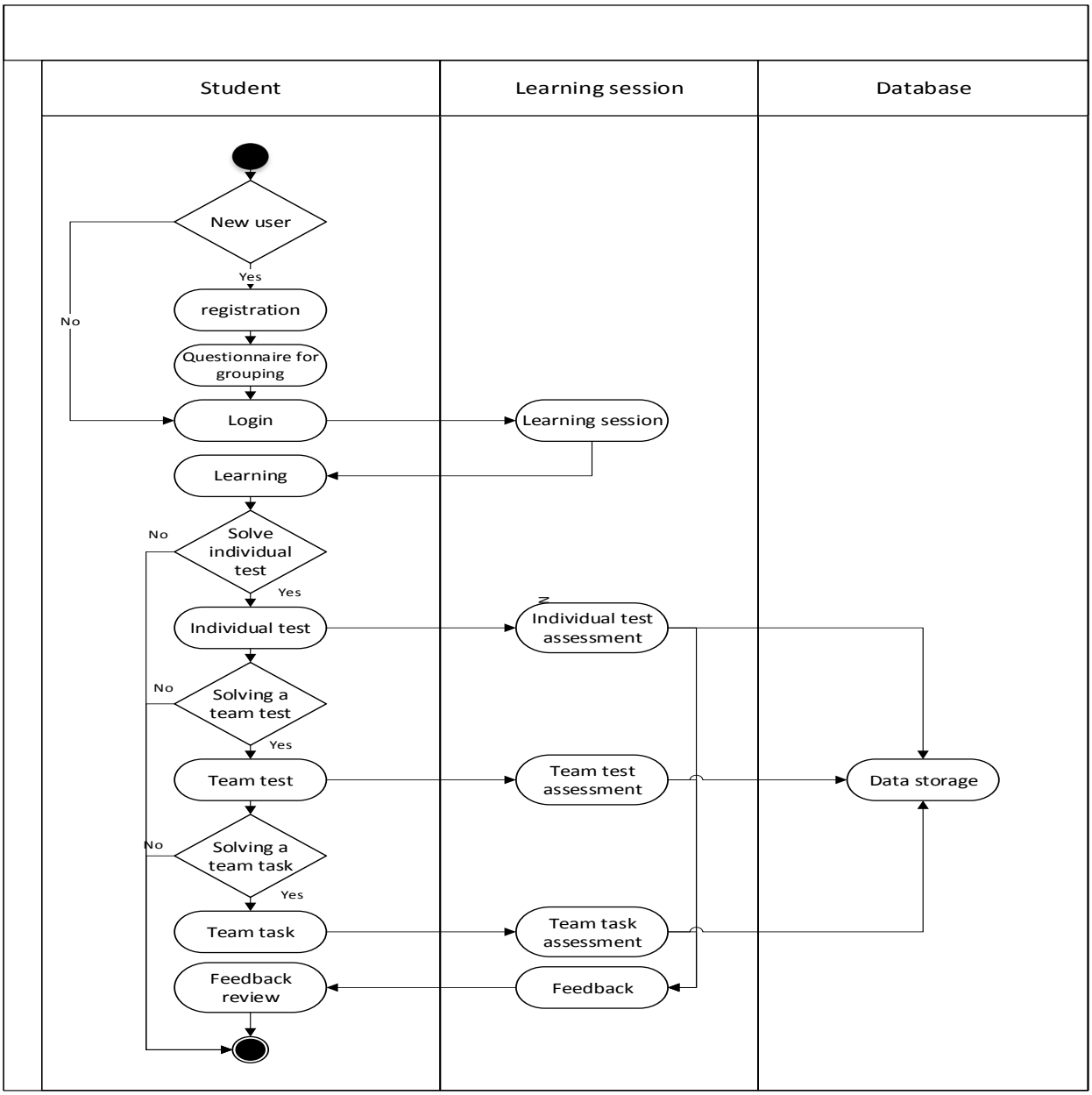
Assigning a student to permanent groups is shown in Figure 3. The study process of the student is presented in Figure 4.



Source: Created by the authors.

Figure 3. Assigning students to permanent groups

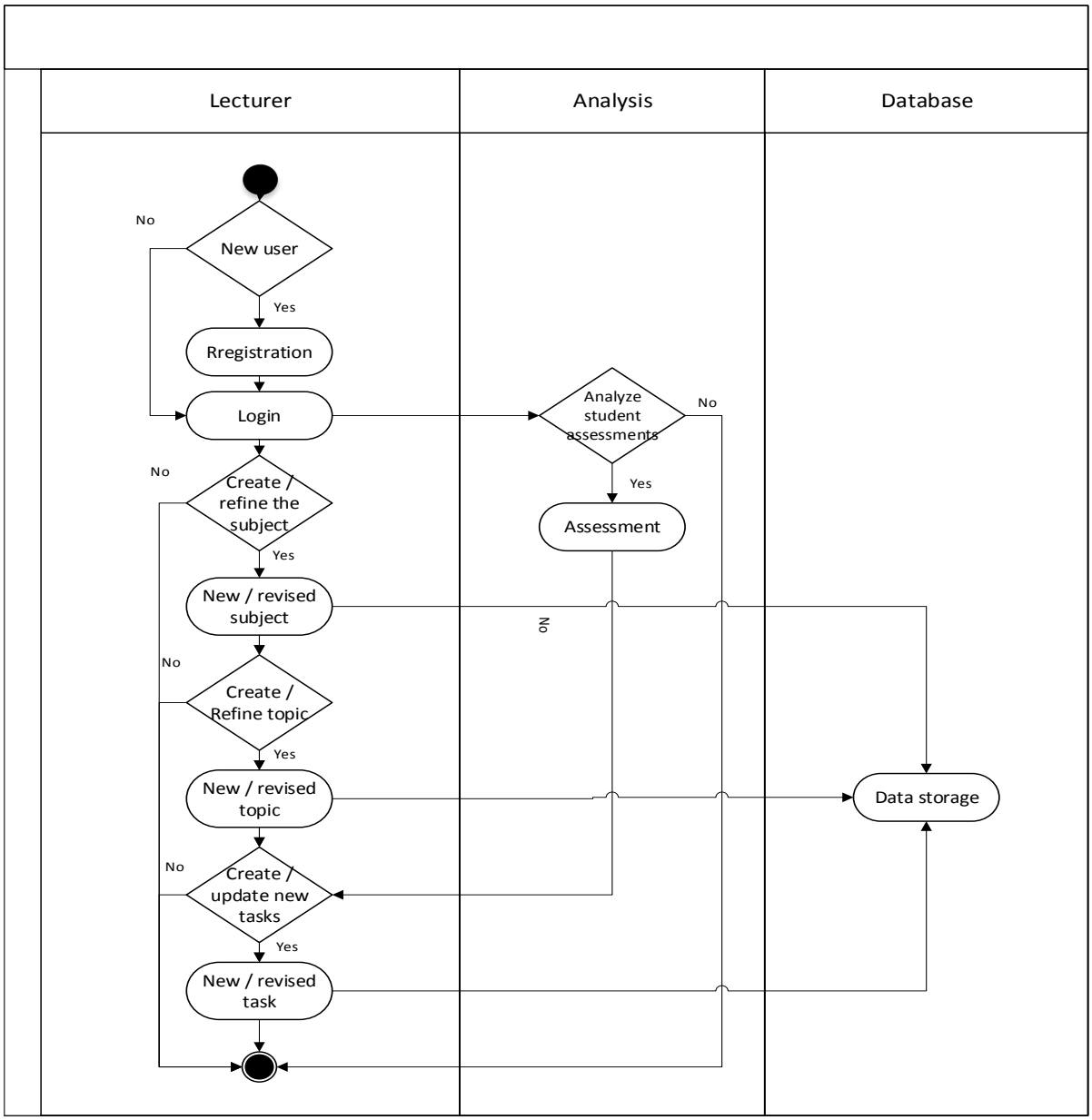
When the scheduled time for the session is available to the student and if he / she is already online and logged in, the individual test must be opened automatically. The individual test does not show the results or the answers. At the end of the prescribed test time, the test must be closed and the other test, the same for whole group is then opened, and the student enters the chat group with other students. They work together on test questions. The group test shows the results of the answers. If you answer incorrectly to any of the test questions, students have to choose another answer once more until right answer has been selected. At the end of the allocated time, the test should close automatically. Then the system explores the next task for the group with a practical situation. The students of the same chat group solve the situation and provide reasoned solutions after the scheduled time. After that, the student has to go into a common group where each group has the opportunity to become acquainted with the answers and arguments of other groups and pass questions to other group members.



Source: Created by the authors.

Figure 4. Student study process

The lecturer tool should consist of six phases; the lecturer registers in the system; develop / adjust the subjects taught; create new or refine existing subject topics; create new or revise existing tasks; analyze student ratings (adjust tasks according to this); completes work in the system. The new lecturer logs in using the login name and password that they have generated. This creates the profile of the lecturer: the name is given in advance, and the subjects taught are created later. Subjects, their topics, training materials and tasks must be stored in the subject database. There are also student assessments that the teacher can analyze. The study process of the student is presented in Figure 5.



Source: Created by the authors.

Figure 5. Lecturer's activity process

Collection of statistical information

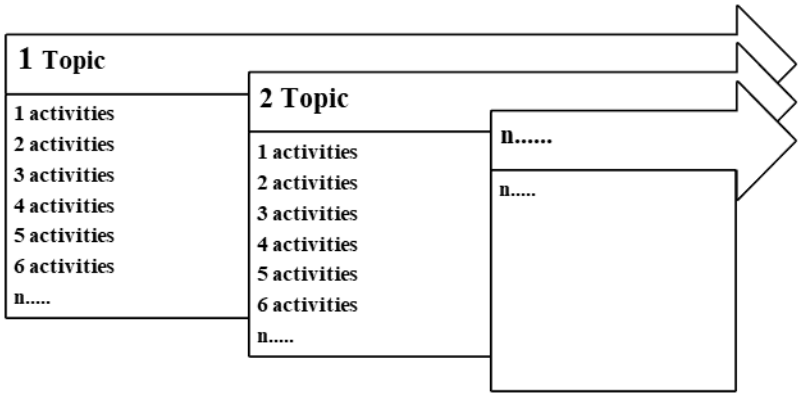
Information about students and their achievements should be collected:

1. Questionnaire for permanent grouping (students in the questionnaire must indicate the following features: study programme; average of the semester (approximate); gender; age; nationality; race; city of origin).

2. Learning outcomes: Individual test results; Team test results; Team task results; Exam results.

This statistical information is needed for a teacher who can adjust team-based learning tasks according to student's results and estimate further topic's complexity to make them resolvable by

the team groups. Because of too difficult tasks must be passed to students gradually but not at the beginning of team-based studies virtually at first lesson.



Source: Created by the authors.

Figure 6. Structure of the study subject

Structure of the study subject

The structure of the study subject of the virtual team-based learning strategy model is shown in Figure 6. In this case, the study subject is understood as a cycle of knowledge creation and is divided into certain time units: topics and activities that contain a certain content (activity) of knowledge.

6. Research limitation

This research its only first step - to create a model for bachelor studies based on the elements of a team-based learning strategy for the e-learning environment , next steps should be to validate the model, then to construct a prototype and last - validate prototype.

7. Conclusions

1. Students whose studies were based on the Team-based learning strategy were better off with teamwork skills than those who did not have a Team-based learning strategy in their studies. Team based learning is widely applied in higher education, and its impact studies are carried out in various fields of study and in various programmes: public administration, sociology, human resources, business administration, ethics and management, microeconomics and other social sciences. Most of the research has been carried out in the field of team-based teaching / learning in biomedicine and pharmaceuticals in particular. The 2012 Team-based learning strategy was applied in over 60 US and other countries' health schools. Later, the TBL strategy spread to various parts of the world: Asia, Europe, and the Middle East. There are many world-wide e-learning systems that are used by several hundred to several million users. Open sources are Moodle, Canvas and Sakai.

All others are commercial systems of which Blackboard is the most popular. However, none of them have an environment tailored to a Team-based learning strategy or its elements.

2. A model based on elements of a Team-based learning strategy has been developed to support team skills. The advantage of the model is that it is not linked to any of the world-wide e-learning environments but can easily be connected to existing ones. Ontology-based guidance system, suggesting learning components (learning activities, environments, tools, programs and etc.).

3. To implement the virtual team based strategy model, it is suggested to choose the principle of individual micro services, this principle has advantages for the client -> internet -> server infrastructure, because in this way it is possible to gracefully restart services, or simply hide from the last users' unexpected system crash. In addition, there is a need for expansion based on the principle of cloud service providers. i. y. dynamically control the number of affiliate processes on demand depending on the number of users growth, and capabilities of physical server resources. Although these are autonomous processes, they can communicate between each other via PIPE channels or signals. Such a solution allows developers easily integrate entities into any other VM environment that can run on Linux, Unix and, in some cases, Windows platforms.

4. The developed model should be designed for the Internet and desirable, should support as much web browsers as possible. Lecture perspective have to be simple to use: it places the material's, connects embedded media files, develops the subjects taught, creates / adjusts the tests and tasks, analyses the achievements of the students, completes the work process in the system. The learning system from the perspective of the student should also be simple: although the first entry requires completing the form provided by lecturer which data directly involved in an assignment of student. The permanent groups have to be properly formatted by a lecturer, According to the Michelson, is particularly important for grouping as diverse students.

5. The new student joins the learning system using the login name and password generated by him / her what have to be absolutely secure by taking into consideration General Data Protection Regulation in EU. When a learner completes his / her work in the system, his / her learning outcomes (evaluations) are automatically summarized.

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